

## WHITE PAPER

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# Managing the Impact of Downtime Using VERITAS Software's High Availability Technologies

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## IDC OPINION

Downtime costs organizations around the world billions of dollars a year. The financial and operational impact of down production lines, order entry systems, electrical utility grid infrastructures, capital market trading systems, or a myriad of other mission-critical systems contributes to these costs, which are both immediate and long term. Lost productivity, lost orders, lost customers, and even lost lives add to the toll.

Prudent business people all over the world work to eliminate or lessen the impact of downtime. IT managers are a part of this group rising to the challenge. In addition to lessening the impact of traditional unplanned downtime by backup, recovery, and business continuity planning, IT managers are looking more closely at lessening the impact of planned downtime. Studies around downtime indicate that planned downtime amounts to 60% of total downtime. Planned downtime occurs more often than unplanned downtime, partly because hardware systems are more robust and resilient than ever.

VERITAS has stepped up to help these managers address both types of downtime. Loss of productivity due to unplanned or planned downtime is becoming more of a drain on organizations and hence more unacceptable. Prudence suggests a thorough examination of downtime avoidance and mitigation. IDC's view is that an evaluation of VERITAS solutions in this area is part of a prudent choice.

VERITAS Software has successfully served the needs of its customers since 1989. Approaching \$2 billion in revenue, it is in the top ranks of software companies in the world. VERITAS Software's backup and archive software, storage resource management software, clustering and availability software, and file system software drive this success.

## IN THIS WHITE PAPER

Many organizations have investigated and invested in data protection and disaster recovery solutions for unplanned downtime solutions. These technologies can also be leveraged for planned downtime operations, potentially shrinking both administrative costs and outage windows while providing business value to organizations. These tools automate procedures to make administrators more efficient, reduce the possibility of human error, and accelerate processes while keeping data and applications available to end users.

The clustering, storage replication, and volume management tools that make up a high availability/disaster recovery solution for many companies can contribute to reducing many of the costs that contribute to a positive ROI when they do double duty as facilitators of planned downtime projects.

Another benefit is that these tools automate procedures, reducing administrative costs, increasing efficiency, and reducing the possibility of error. Many highly automated routine procedures can be initiated remotely by administrators or run as timed events at night rather than bringing down the application to perform the maintenance during peak hours or incurring administrative overtime charges to perform the procedures during weekend hours.

The most significant benefit, however, is the ability of these tools to reduce the outage window to the shortest possible time and to eliminate it completely in many cases. Using clustering technologies, users can be migrated to another set of physical systems without the need for them to reconnect.

In this IDC White Paper, IDC examines how IT organizations can leverage disaster recovery solutions to reduce planned downtime. The document presents IDC's well-established virtual environment software model and how this software model supports a dynamic enterprise. It then evaluates the features and functions offered by VERITAS Software's high availability products in the context of this model. IDC then reviews the challenges VERITAS Software faces in today's market and presents recommendations and guidance.

## SITUATION OVERVIEW

IDC's market studies have repeatedly indicated that organizations are seeking approaches to address concerns, including the following:

- ☒ Organizations desire to lower hardware, software, and staff-related costs of their IT infrastructures.
- ☒ Organizations are seeking ways to make IT investments provide real business value and more closely align with their total enterprise goals and strategies.
- ☒ Organizations are seeking ways to manage the impact of planned and unplanned downtime as part of their need to reduce costs and to provide reliable, more responsive IT infrastructures.
- ☒ These concerns are critical, and organizations are looking to and increasingly demanding that their senior IT partners provide solutions.

Today many companies have implemented clustering, volume management, and storage replication technologies as a line of defense against unplanned downtime — server failures, site outages, and other events that threaten customer service levels. However, these technologies can also be leveraged to reduce the costs and outage windows of planned downtime events — a significant ROI bonus.

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## **Complexity Means Higher Costs**

Over time, organizations have adopted new information technologies to support new applications and placed them alongside older technology rather than abandoning their previous investment in systems, software, and processes. This approach has often led to an IT infrastructure that resembles a layered marble cake. The foundation is often 20 years old. Layered and swirled into that foundation are layers of new technology. Administering, operating, and supporting a complex environment can be costly.

The frequency of scheduled downtime processes is increasing. Typically, a large enterprise datacenter running hundreds of applications and multiple classes of applications, as well as hundreds or even thousands of systems, calls for increased downtime scenarios. The challenge is to schedule time to reconfigure systems, perform upgrades, and apply patches without impacting productivity. The zero delay tolerance of external users and the effects of lost productivity and lessened job satisfaction of internal users are driving the need for better ways to handle planned downtime.

Microsoft products, for example, have been under attack by hackers. In response, Microsoft issues new security patches almost weekly for its operating systems, or for Microsoft Exchange, to close the door on a virus or to change the rules for opening attachments. The patches and upgrades are applied at the administrator's discretion, but a planned downtime process could occur as often as once a week.

Performing these routine operations without disrupting service is a major concern for companies today. The immediacy of online services has produced a culture of end users who tolerate few delays and no perceived downtime. For online businesses, for example, an outage or slowdown that lasts 15 or 20 minutes is almost guaranteed to drive impatient customers to other sites for goods and services. If they experience the delay again, customers could be gone for good. From the standpoints of revenue and site branding, these are serious concerns. In addition, the inability to access critical applications within an organization could impact employee productivity and decrease overall employee satisfaction with the IT department.

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## **Making IT Deliver Real Business Value**

Organizations have been facing extreme pressure to make every aspect of their environments produce real business value, value that can be measured, and value that can be related directly to the bottom line. Decision makers within these organizations are asking questions such as the following:

- Are we doing the right things?
- Are we doing things as efficiently as possible?

- Are there things we shouldn't be doing at all?
- Are there things we're doing now that others could do better?

The answers to these questions help organizations optimize their IT operations. The March issue of Executive Insights (*What Do Users Really Want from Utility Computing?* IDC #31062) shows that users' dynamic IT strategies are driven by three primary objectives:

- Speed:** Respond faster to changing business needs
- Performance:** Provide better IT service levels in support of business
- Cost:** Continuously drive down IT unit costs

By reducing planned downtime, organizations can drive down overall IT costs.

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## **Managing the Impact of Planned and Unplanned Downtime**

### ***Planned Downtime***

Planned downtime today really refers to any planned administrative operations that could potentially interrupt or slow down service, such as server upgrades, data movement, server consolidation, and site maintenance. Planned downtime occurs far more often than unplanned downtime, partly because hardware systems are more robust and resilient than in the past. Changes, while unavoidable, are a leading factor in the cause of downtime.

IDC has observed that when downtime is planned, the staff-related costs of administration, operations, and support are minimized. If operations of a function can continue during the planned outage, most of these costs can be contained. Furthermore, organizations that have instituted processes and procedures allowing critical functions to continue are not likely to lose customers or the productivity of their staffs, partners, or consultants due to system outages.

Some of the benefits include the following:

- Hardware and software maintenance no longer has to be a traumatic event. The work done by application systems can continue, even though a system, peripheral device, network interface, or any other individual hardware component must be taken offline for a time. With proper planning, maintenance operations may no longer need to be done at odd hours of the night or on weekends. Thus, organizations no longer need to work in crisis mode.
- Archival backup of critical applications and data can be done using a current snapshot of these application and data files while application systems continue their work.
- Software updates or new applications can be brought up and tested without negatively impacting the availability of current application systems that are driving the business.

### ***Unplanned Downtime***

IDC has also observed that if an outage is unplanned, a significant number of administrative, operations, and support functions must be redirected to isolating the problem that caused the outage, determining what can be done to solve the problem, working to make the function available to the network in some form while the real problem is resolved, and then resolving the problem that caused the outage.

## **VIRTUAL ENVIRONMENT SOFTWARE**

Virtual environment software is a key element of dynamic IT. This software creates an image of a single computing resource to the end user, even though the actual computing environment might be made up of either centralized resources in a single datacenter or distributed systems housed in datacenters all over the globe. The end user can be connected to the third floor or to systems across the street or in Kuala Lumpur.

Virtual environment software can break the link between a given function and the underlying systems. This means that functions may survive the loss of their original host systems. In case of a failure or slowdown, some forms of virtual environment software will either start the function on another system or pass the request to another instance of that application or function. The newest generation of virtual environment software allows organizations to increasingly see their systems as a pool of shared resources that appears to be both self-healing and self-managing.

In the end, this allows organizations not only to protect their investments in hardware and software but also to optimize those investments. A completely virtual environment allows established applications or functions to access features of newer systems and to be more reliable, more powerful, more scalable, or enhanced in some other way.

To take part in a virtualized environment, an organization must carefully consider all these factors and then deploy support for each of these layers of software.

The layers of software are as follows:

- ☒ **Virtual access software.** This software allows applications to be accessed from nearly any intelligent access point device over just about any network without the application having to have been architected to support that device or network.
- ☒ **Virtual application environment software.** This software creates an application development and deployment environment that allows properly developed applications to be more robust and reliable and also to be unaware of the underlying operating environments and hardware platforms.
- ☒ **Virtual processing software.** This category of software ranges from virtual machine software making a single system appear to be many systems, each supporting its own operating environment, to single system image clustering software, which makes many systems appear to be a single computing resource, running a single operating environment.

- ☒ **Virtual storage software.** This software allows applications to be unaware of where and how application and data files are actually stored.
- ☒ **Management software.** This software enables operators and administrators to load, manage, and operate multisystem configurations regardless of whether any of the other virtual environment software categories are present.
- ☒ **Security software.** As applications are decomposed into components (sometimes called services), identity management and access control become increasingly important. Without a strong security layer, "black hats" could pick apart the distributed architecture and commandeer application components or functions to an organization's detriment.

These layers of software help an organization in its quest to truly implement dynamic IT and more effectively manage downtime.

## **VIRTUAL ENVIRONMENT SOFTWARE TO REDUCE PLANNED DOWNTIME**

Clustering software, a component of the virtual processing software layer, is a key element in lessening the impact of planned server and application downtime. This software creates an image of a single computing resource to the end user, even though the actual computing environment might be made up of several physical servers running the application. The end user can be connected to any of the servers within the cluster. During a planned downtime scenario, users can be redirected from one physical machine to another without bringing the application offline. The users are not impacted by the migration, and normal server operations can occur on the original server while the users are accessing the application that is running on another server. Once the upgrade is completed on the original server, the users can be moved back without causing extensive application downtime.

The components of the virtual storage software layer, including volume management and replication technologies, can protect organizations against planned downtime of storage arrays. Volume management software can mirror data across several physical arrays, thereby virtualizing the data to the application. The end user will still be able to access the data even if a physical storage array is unavailable. Replication software can be used to move data from one physical location to another, thereby allowing access to the data at another location while site maintenance is occurring.

Clustering and data management software can break the link between an application and a given physical system. This means that data and applications can continue to function and be available to end users even if a physical system is undergoing maintenance.

In the end, these technologies allow organizations to ensure that their critical data and applications are protected and available even during maintenance scenarios.

## VERITAS SOFTWARE'S HIGH AVAILABILITY TECHNOLOGY

VERITAS Software was a \$1.8 billion supplier of software and services in 2003. Software contributed approximately \$1.7 billion to the total. The largest contributors to VERITAS Software's software revenue were backup and archive software, storage resource management software, clustering and availability software, and file system software.

VERITAS has been able to leverage the strength of a multivendor, multiplatform offering along with partnerships and alliances with all of the major hardware and software suppliers. It is a leader in IDC's virtual environment software competitive market.

Organizations interested in an operating environment-neutral standard often turn to VERITAS. The vendor will continue to have success with organizations that have settled on a multiplatform strategy.

Leveraging the VERITAS offering in clustering, replication, and volume management across both unplanned and planned downtime planning supports a double-duty approach to optimize resources and deliver the potential of a better ROI for both the IT and enterprise organizations.

The next section reviews the capabilities offered by VERITAS Software's high availability technology and how this technology fits into IDC's virtual environment software model.

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### VERITAS' Software Products

VERITAS' software addresses the need for applications and data to be available during planned and unplanned downtime. The products in this category include the following.

- ☒ **VERITAS Cluster Server and the Global Cluster Option:** Ensures applications are always online and available even during server and application maintenance scenarios.
- ☒ **VERITAS Storage Foundation:** Allows data to be mirrored across physical arrays, thereby eliminating single points of failures within the storage array and allowing data to be available during storage array maintenance scenarios.
- ☒ **VERITAS Volume Replicator:** Allows data to be moved from one location to another over an IP connection, thereby allowing for site data to be available even during site maintenance scenarios.

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## **Comparing VERITAS Software's Products to IDC's Virtual Environment Software Model**

VERITAS Software is clearly building upon its traditional areas of strength in virtual storage and virtual processing software. In addition, it also offers clustering, volume management, and replication software to address planned downtime needs.

VERITAS Software's synergy with its partners ensures virtual access, virtual application environments, and related security and management software. These partners include suppliers such as BEA, HP, IBM, Microsoft, Oracle, and Sun, and a long list of others.

VERITAS Software focuses on offering multiplatform, vendor-neutral offerings designed to help organizations maintain the productivity and availability of their heterogeneous environments across a wide variety of servers, storage, and applications.

## **THE SOLUTION**

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### **Scenario One: Migrating an Application**

An organization's IT department faces the requirement to move all of its users to another server because all of the computational power in its primary datacenter is in use. It faces the choice of either not being able to satisfy the current requirements and the potential loss of customer satisfaction or finding a way to move the application, with all its user groups and all its data, to available server resources in another datacenter. The IT department can deploy volume management and replication software, such as VERITAS Storage Foundation and VERITAS Volume Replicator, to mirror the data to a storage volume in the distant datacenter. Clustering software, such as VERITAS Cluster Server, can move the application to the new server in a failover operation that preserves the state of the application and its user data. These planned, automated operations can carry out the migration with virtually no impact on service levels and allow users to continue to access their data and applications without incurring the downtime normally associated with an application migration.

### **Scenario Two: Upgrading Microsoft Exchange**

The next scenario is an organization running Microsoft Exchange in a nonclustered environment. If the organization needs to upgrade the system's operating environment software with a new service pack, one approach would be to stop all access to the server supporting Exchange during the upgrade process and then test the results to see if the update caused any unexpected side effects. Organizations following this route would reduce levels of productivity and possibly interfere with revenue-generating activities of all of the users of that system. If the organization were instead running Exchange in a VERITAS Cluster Server environment, then it could easily upgrade the systems supporting Exchange one at a time without also making that application totally unavailable. In a very simple operation with

VERITAS Cluster Server and VERITAS Storage Foundation, the organization could copy the data to another available disk. Exchange could be migrated to another available server within the cluster. Users could still be productive by reconnecting to the Exchange service that is running in the other server. The server originally hosting Exchange could then be updated. Once this upgrade process was completed and the system was tested, users and user data could then be easily migrated back.

## **CHALLENGES/OPPORTUNITIES**

Vendors such as HP, IBM, Microsoft, and Sun offer virtual environment software solutions, which compete with those offered by VERITAS Software. While these solutions can be very powerful, they are also quite often focused on the vendor's own software solutions and may not offer support of products from another supplier. In some cases, some of these suppliers may offer support for some key applications, but not others. For organizations currently deploying a heterogeneous infrastructure or perhaps planning to use one in the future, examination of VERITAS Software's offerings may prove a prudent part of their planning process.

VERITAS Software focuses on multiplatform, multivendor solutions, which support products from all of those suppliers and many others. When an organization is planning to construct a dynamic IT environment using a mixture of products from many suppliers, VERITAS Software's offerings come to the forefront.

## **CONCLUSION**

Organizations that are in the process of evolving their IT infrastructures from static silos into dynamic IT are well advised to closely evaluate VERITAS Software's high availability software offerings such as VERITAS Cluster Server, VERITAS Volume Replicator, and VERITAS Storage Foundation. Organizations that have heterogeneous IT environments and have plans to maintain those investments over time are likely to find VERITAS Software's broad platform support very useful. IDC believes that VERITAS Software's range and depth of virtual environment software offerings provide features and functions that can be used to address the requirements of a dynamic enterprise while achieving significant cost savings by reducing planned downtime.

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